

UNITED STATES MARINE CORPS  
LOGISTICS OPERATIONS SCHOOL  
MARINE CORPS COMBAT SERVICE SUPPORT SCHOOLS  
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**STUDENT OUTLINE**

CHARACTERISTICS OF AMPHIBIOUS SHIPS, LANDING CRAFT,  
AMPHIBIOUS VEHICLES AND USMC AIRCRAFT

**LEARNING OBJECTIVES**

1. Terminal Learning Objective: Given the task to coordinate a unit's transportation requirement, an operations order, listing of supplies, equipment, and personnel, and the references, coordinate transportation assets are available to support unit deployment.  
(0402.04.01)
2. Enabling Learning Objective:
  - a. Identify the publications that pertain to the characteristics of amphibious ships, landing craft, and amphibious vehicles.
  - b. Identify the mission, characteristics, and restrictions of each amphibious ship, landing craft, and amphibious vehicles.

**OUTLINE**

1. **Amphibious Ships**:

a. Amphibious Command Ship, (LCC). The mission of the LCC is to serve as the command ship, for the commander of the amphibious task force (CATF); commander of the landing force (CLF); and the air control group commanders during an amphibious operation.

(1) The LCC has a distinctive design; its hull was mirrored after that of the LPH, which was designed and built to transport helicopters. The ship is outfitted with the most advanced communications systems available that support all the command and control requirements for the

CATF, CLF, and the air control commander. There are currently two active LCC's; the USS Blue Ridge (LCC-19) stationed in Yokosuka, Japan and the USS Mount Whitney (LCC-20) stationed in Norfolk, VA.

(2) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 2.

b. Amphibious Assault Ship (General Purpose) (LHA). The mission of the LHA is to embark, deploy, and land elements of a Marine landing force in an amphibious operation by helicopter, landing craft, amphibious vehicles or by a combination thereof.

(1) Some of the LHA's characteristics were taken from other amphibious ships that are no longer in active service. The idea was to design a ship that could carry amphibious cargo (like the LKA, five hulls are currently maintained in Ready Reserve Fleet (RRF)); Carry a composite helicopter squadron (like the LPH, all of which were scrapped except the USS Inchon, LPH-12, which was converted to a Mine Counter Measures Command Ship); and provide amphibious transport with a well deck (like the LPD, there are 11 active hulls). These features include a full-length flight deck capable of launching and recovering an AV-8 Harrier detachment, and a composite squadron of USMC helicopters. The well deck was designed to accommodate the World War II generation of landing craft of which only the Landing Craft Utility (LCU 1600 series) remains our preferred landing craft when landing from the LHA's well deck. The LHA also provides embarked forces with large vehicle deck stowage areas for USMC equipment and ammunition holds capable of holding 10 days of Class V(W), Class V(A), and other ancillary supplies maintained in the ships holds. The LHA design has provided commanders with a very unique capability for than 30 years. This design was also adopted into the design of the LHD when the Navy was looking at building a ship that would eventually replace the LHA. There were five ships built and they were named after major battles. The five ships of the *Tarawa Class* are:

<b>Ship Name</b>		<b>Home Port</b>
USS Tarawa,	LHA-1	San Diego
USS Saipan,	LHA-2	Norfolk
USS Belleau Wood,	LHA-3	San Diego
USS Nassau,	LHA-4	Norfolk
USS Peleliu,	LHA-5	San Diego

(2) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 4, or the Ship's Loading Characteristics Pamphlet (SLCP).

c. Amphibious Assault Ship (Multipurpose) LHD. The mission of the LHD is to embark, deploy, and land elements of a Marine landing force in an amphibious operation by helicopter, landing craft, amphibious vehicles or by a combination thereof. Also, the LHD is assigned a secondary mission of sea control and power projection.

(1) As mentioned earlier, the LHD's design incorporates the original design features found in the LHA. The LHD can embark and accommodate more of the Marine Expeditionary Unit (MEU). The aviation facilities were improved from the LHA's and are capable of supporting a composite helicopter squadron or a AV-8 Harrier detachment. The well deck of the LHD can accommodate all current types of landing craft currently in use, or can transport up to three Landing Craft Air Cushion (LCAC). The LHD combines the capabilities of the LHA and the LSD making it a versatile and extremely capable addition to the fleet. As of October 2000 current plans call for building eight LHD's. The eight planned ships of the *Wasp Class* LHD are:

<b>Ship Name</b>	<b>Home Port</b>
USS Wasp, LHD-1	Norfolk
USS Essex, LHD-2	Sasebo, Japan
USS Kearsage, LHD-3	Norfolk
USS Boxer, LHD-4	San Diego
USS Bataan, LHD-5	Norfolk
USS Bon Homme Richard, LHD-6	San Diego
*USS IWO JIMA, LHD-7	Norfolk
**Unnamed LHD-8	

(2) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 6, or the Ship's Loading Characteristics Pamphlet (SLCP).

\*Under construction, August 2002 projected delivery date.

\*\*Planned for but not funded as of August 2000.

d. Amphibious Transport Dock (LPD). The mission of the LPD is to transport and land-embarked forces and their equipment by embarked landing craft or amphibious vehicles augmented by helicopters in an amphibious assault.

(1) The LPD is a versatile ship that performs the mission of amphibious transports, amphibious cargo ships, and the older LSDs by incorporating both a flight deck and a well deck that can be ballasted and deballasted to support landing craft. The Navy's newest class of ship, *San Antonio* (LPD-17), is scheduled to replace the older *Austin Class* LPD 4. The new LPDs will have increased vehicle and substantial cargo carrying capacity, which will make it a key element of 21<sup>st</sup> Century Amphibious Ready Groups. The *San Antonio* class will integrate the latest in shipbuilding and warfighting technologies to support current and future Marine Corps aircraft, the Advanced Amphibious Vehicle (AAAVs) and air cushion or conventional landing craft.

(2) The LPD-17 will be a highly reliable, warfare capable ship and the most survivable amphibious ship ever put to sea. The design incorporates state-of-art self-defense capabilities, C4I, and reduced radar cross section signature technologies. The ship will have the ability to carry LCACs and AAAVs. Current plans call for building 12 *San Antonio* class LPD's over a ten-year period. As the newer LPDs are built and delivered to fleet, the older *Austin* class LPDs will be decommissioned. Listed below are the *Austin* class LPDs and their home ports along with the *San Antonio* class LPDs and their projected delivery dates and home ports.

**Austin Class LPDs:**

<b><i>Ship Name</i></b>	<b><i>Home Port</i></b>	<b><i>Decommission Date</i></b>
USS Austin, LPD-4	Norfolk	2005
USS Ogden, LPD-5	San Diego	2003
USS Duluth, LPD-6	San Diego	2005
USS Cleveland, LPD-7	San Diego	2008
USS Dubuque, LPD-8	San Diego	2008
USS Denver, LPD-9	San Diego	2005
USS Juneau, LPD-10	San Diego	2007

USS Shreveport, LPD-12	Norfolk	2004
USS Nashville, LPD-13	Norfolk	2007
USS Trenton, LPD-14	Norfolk	2007
USS Ponce, LPD-15	Norfolk	2008

**San Antonio Class LPDs:**

<b><i>Ship Name</i></b>	<b><i>Home Port</i></b>	<b><i>Commission Date</i></b>
USS San Antonio, LPD-17	Norfolk	2003
USS New Orleans, LPD-18	San Diego	2004
LPD-19 <b><i>Contract Awarded</i></b>	Norfolk	2005
LPD-20 <b><i>Contract Awarded</i></b>	San Diego	2005
LPD-21	San Diego	Projected 2006
LPD-22	Norfolk	Projected 2006
LPD-23	San Diego	Projected 2006
LPD-24	San Diego	Projected 2007
LPD-25	Norfolk	Projected 2007
LPD-26	San Diego	Projected 2007
LPD-27	Norfolk	Projected 2008
LPD-28	Norfolk	Projected 2008

(3) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, pages 14 & 15, or the Ship's Loading Characteristics Pamphlet (SLCP).

e. Dock Landing Ship Whidbey Island Class (LSD). The Mission of the LSD-41 class is to transport and launch loaded amphibious craft and vehicles with their crews and embarked personnel in amphibious assaults by landing craft and amphibious vehicles.

(1) The LSD-41 class of ship was the designed replacement for the *Thompson Class* LSD, and the *Anchorage Class* LSD. The Whidbey Island Class (LSD-41) was designed specifically to operate the Landing Craft Air Cushion (LCAC) vessel. It has the largest capacity for the LCAC (four) which is more than any other Amphibious Platform. It can also provide docking and repair service for the LCAC and other conventional landing craft. In 1987 the Navy requested additional funding to build a *Cargo Variant* of the LSD-41 Class.

(2) The LSD-49 (*Harpers Ferry Class*) differs from the original LSD-41 by reducing the number of LCACs that it

can carry to two. The was done to add additional cargo capacity to the ship.

**Whidbey Island Class LSD:**

<b><i>Ship Name</i></b>	<b><i>Home Port</i></b>
USS Whidbey Island, LSD-41	Little Creek, Va.
USS Germantown, LSD-42	Sasebo, Japan
USS Fort McHenry, LSD-43	Sasebo, Japan
USS Gunston Hall, LSD-44	Little Creek, Va.
USS Comstock, LSD-45	San Diego
USS Tortuga, LSD-46	Little Creek, Va.
USS Rushmore, LSD-47	San Diego
USS Ashland, LSD-48	Little Creek, Va.

**Harpers Ferry Class:**

<b><i>Ship Name</i></b>	<b><i>Home Port</i></b>
USS Harpers Ferry, LSD-49	San Diego
USS Carter Hall, LSD-50	Little Creek, Va.
USS Oak Hill, LSD-51	Little Creek, Va.
USS Pearl Harbor, LSD-52	San Diego

(3) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, pages 24 thru 28, or the Ship's Loading Characteristics Pamphlet (SLCP).

f. Tank Landing Ship (Newport Class LST): The mission of the LST is to transport and land amphibious assault vehicles, tanks, combat vehicles, and equipment in an amphibious assault.

(1) The Newport Class LST was designed to employ higher speed and trimmer lines than "snub-nosed" LST designed during World War II. Ships of this class are the first to depart from the bow-door design that characterized the workhorses of World War II. A unique characteristic of the Newport Class LST is the two huge derricks used to extend and retract its 100-foot bow ramp. When extended, the ramp is attached to the main deck by a pivot post. The end of the ramp rests on a beach or pontoon causeway depending on the water depth and beach gradient. A stern gate allows off-loading of amphibious vehicles directly into the water. There are two remaining ships of this class of 20 that were built that are now assigned to the

Naval Reserve Forces. The USS Frederick, LST-1184 is home ported at Pearl Harbor, Hi. The USS LaMoure County LST-1194 is home ported at Little Creek, Va.

(2) For additional ship characteristics refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 30, or the Ship's Loading Characteristics Pamphlet (SLCP).

## **2. Landing Craft:**

a. Landing Craft Air Cushion (LCAC). The mission of the LCAC is to transport and land heavy vehicles, equipment, personnel, and cargo during ship-to-shore and across the beach in an amphibious assault.

(1) The LCAC is a new generation of amphibious landing craft. Combining the heavy lift capability of the surface assault with the high speeds of helicopterborne assault, the LCAC adds a new dimension to the capabilities of the amphibious force. The LCAC is capable of carrying 60-75 ton payload. The advantages of air-cushion landing craft are numerous. Such as carrying heavy payloads such as the M-1 tank, at high speeds. Their payload and speed means more forces reach the shore in a shorter time, with shorter intervals between trips. The air cushion allows this vehicle to reach more than 70 percent of the world's coastline, while conventional landing craft such as the Landing Craft Utility (LCU 1600 series) can land at only 15 percent of the world's coastlines.

(2) Thirty-three air-cushion landing craft were authorized and appropriated through Fiscal year (FY) 1986. An additional 15 were funded in FY89, 12 more in FY90 and FY91. The remaining 24 were funded in FY92. As of December 1995, 82 LCACs have been delivered to the Navy.

(3) For additional general characteristics on the LCAC, refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 31.

b. Landing Craft Utility (LCU). The mission of the LCU is to land heavy vehicles, equipment, personnel, and cargo during ship-to-shore of an amphibious assault.

(1) The tank landing craft (LCT) of World War II is the predecessor of the LCU. Because of the LCTs versatility and use in landing almost anything, the name was changed to the LCU. This craft has been adapted for many purposes including salvage operations, ferry boats for vehicles and passengers, and underwater test platforms. It is a self-sustaining craft with habitability features found aboard ships. The steel hull provides high durability with deck loads of 800 pounds per square foot. The arrangement of machinery and equipment has been taken into account with built-in redundancy in the event of battle damage.

(2) The LCU is capable of transporting tracked or wheeled vehicles and troops from amphibious assault ships to beachheads, ramps, or piers. The LCU has both a bow ramp and stern ramps for on-load/offload at either end. The LCU can be married to another LCU for offloading if required.

(3) For additional Craft information, refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 33.

c. Landing Craft Mechanized (LCM). The mission of the LCM is to land heavy vehicles, equipment, personnel, and cargo during ship-to-shore of an amphibious assault.

(1) Like the design of the LCU the LCM-8 comes from the World War II generation of landing craft. The active use of the LCM-8 is limited and is rarely seen on board Naval amphibious ships any longer. The LCM-8's are still placed on board and are still utilized during Maritime Prepositioning Force (MPF) Operations.

(2) For additional Craft information, refer to FMFRP 1-18, Amphibious Ships and Landing Craft Data Book, page 35.

d. Amphibious Assault Vehicle (AAVP7). The mission of the assault amphibian vehicles is to land the surface assault elements of the landing force and their equipment in a single lift from assault shipping during amphibious operations to inland objectives. Normally a Detachment of AAVs will embark with a Marine Expeditionary Unit to support one Line Company during an amphibious assault.



e. Lighter, Amphibious, Resupply, Cargo, 5 Ton (LARC V). The LARC V is a lightweight, aluminum hulled, terratired amphibious vehicle having moderate water speed and good surfing ability. This vehicle is not suitable for swampy terrain and is not mobile in heavily irrigated terrain. It is suitable for transporting cargo from ship-to-shore, to beaches or up fairly wide rivers and canals to semi-prepared landing areas.

3. Mine Countermeasures Ships: In the early 1980's the U.S. Navy Began development of a new mine countermeasures (MCM) force, which included two new classes of ships and minesweeping helicopters. The vital importance of a state-of-the-art mine countermeasures force was strongly understood in the Persian Gulf during the eight years of the Iran-Iraq war, and in *Operations Desert Shield* and *Desert Storm* in 1990 and 1991 when the *Avenger* (MCM 1) and *Guardian* (MCM 5) ships conducted MCM operations.

a. The *Avenger* class ships are designed as mine hunter-killers capable of finding, classifying and destroying moored and bottom mines. The last three MCM ships were purchased in 1990, bringing the total to 14 fully deployable, oceangoing *Avenger* class ship.

b. These ships use sonar and video systems, cable cutters and a mine-detonating device that can be released and detonated by remote control. They are capable of conventional sweeping measures. The ships are of fiberglass sheathed, wooden hull construction. They are the first large mine countermeasures ships built in the United States in nearly 27 years.

c. There are currently 14 *Avenger* class MCM ships in the active fleet. The ships are crewed with 8 officers and 76 enlisted.

d. Mine Countermeasures Command Ship - MCS.

(1) Background: After the events that occurred during *Operations Desert Shield* and *Desert Storm* the need for a dedicated command, control support ship to support mine countermeasures operations. In November 1994, a contract was awarded to Ingalls Shipbuilding, Inc.,

Pascagoula, Miss., to convert the *USS Inchon*, LPH-12 to be the *USS Inchon*, MCS 12, Command Ship.

(2) The *USS Inchon* was converted from an amphibious assault ship with major changes to the Command, Control, Communications, Computers and Intelligence (C4I) system including upgrades to close-in weapons system (*Phalanx*) and various radars. The ship supports an embarked composite helicopter squadron of eight CH-53E and two SAR/spotter helicopters, and provides alongside support and services for up to four MCM/MHC ships. It can also accommodate four Explosive ordnance Disposal (EOD) groups with assigned equipment. Additionally, it provides C4I facilities for the MCM group commander.

#### 4. USMC Aircraft during an Amphibious Operation:

##### a. Transport Helicopters

(1) CH-46 (Sea Knight): The CH-46 is a two engine, dual-piloted, tandem-rotor helicopter. The primary mission of the CH-46 is to rapidly transport combat troops. Additionally, the CH-46 has been used to transport support equipment, and supplies under all-weather conditions, day or night. The cabin contains provisions for accommodating 21 troops, or 15 litters, and two helicopter crew personnel or medical attendants. The cabin may also be used for cargo. An integral cargo handling and rescue system is provided within the cabin. The cabin floor and loading ramp incorporate parallel track and roller assemblies to facilitate loading and unloading of palletized cargo. Cargo may also be carried externally using the external cargo hook. The CH-46 helicopter is operated by the Marine Medium Helicopter (HMM) Squadron.

(2) CH-53E (Super Sea Stallion): The CH-53E is a single rotor, three engine, heavy-lift, assault transport helicopter. The primary mission of the CH-53E is to provide the heavy-lift transport of supplies and equipment for the landing force during the ship-to-shore movement and within the objective area. The CH-53E is configured for rear ramp loading; with cargo winches, roller conveyors, cargo tie down facilities, and an external cargo hook incorporated for the primary task of movement of cargo. Troop seats and litter attachment facilities are provided for the secondary mission of moving troops. The CH-53E can

normally carry from 35-55 troops. The CH-53E helicopter is operated by the Marine Heavy Helicopter (HMH) squadrons.

(3) UH-1 (Iroquois) (Huey): The mission of the UH-1 is to provide the necessary utility helicopter support to the landing force in the ship-to-shore movement and within the objective area. The tasks of the UH-1 include airborne command and control, liaison and courier services, and casualty evacuation. The Marine Light/Attack Helicopter squadrons operate the UH-1.

(4) AH-1 (Cobra): The mission of the AH-1 is to provide close-in fire support during aerial and ground escort operations within the objective area. The Marine Light/Attack Helicopter squadrons operate the AH-1.

(5) AV-8B (Harrier): The mission of the AV-8's is to provide offensive close air support to the landing force. The AV-8 is unique to all other fixed wing aircraft in that it is capable of vertical takeoff and landing (VTOL) like a helicopter and short takeoff and landing (STOL) like a conventional fixed wing aircraft. An AV-8 detachment is routinely deployed with forward-deployed MEUs on the LHA or the LHD. The Marine Attack squadrons (VMA) operate the AV-8's.

(6) V-22 Osprey: The V-22 Osprey is the first aircraft designed to meet the needs of all four U.S. armed services. The aircraft can transport Marine Corps assault troops and cargo using its medium lift and vertical takeoff and landing capabilities. It can carry 24 combat troops, or up to 20,000 pounds of internal or external cargo, at twice the speed of a helicopter. It includes cross-coupled transmissions so either engine can power the rotors if one engine fails. The aircraft is the replacement for the CH-46 aircraft currently flown by our HMM squadrons. The aircraft will be flown by Marine Medium squadron (VMM) with the first operational squadron planned for the East Coast to deploy in 2003. The first West Coast deployment is planned for 2006. Listed below are some key dates and miscellaneous information on the MV-22 Osprey.

- VMMT-204 (12 aircraft for training) Mar 2001
- VMM-266 Begins Transition Mar 2001
- MV-22 Full Operational Capable (360 aircraft) 2015
- 1<sup>st</sup> Deployment East coast 2003
- 1<sup>st</sup> Deployment West coast 2006

- Fielding Reserves 2011 to 2014 - 4 squadrons
  
- **Active Forces:**
  - 14 Tactical 12 plane CH-46 squadrons
  - 4 Tactical 8 plane CH-53D squadrons
  - 2 CH-46 Fleet replacement squadrons (HMT-204 and 164)
  - 1 CH-53D Fleet replacement squadron HMT-301
  - HMX-1
  
- **Will transition to the following lay-down:**
  - 18 tactical 12 plane MV-22 squadrons
  - 1 Fleet replacement squadrons 40 planes
  - HMX-1 19 planes
  
- **Reserves:**
  - 2 CH-46 12 plane squadrons
  - 2 CH-53E 8 plane squadrons
- **Will transition to:**
  - 4 MV-22 12 plane squadrons
  
- **End-state:**
  - 20 Active MV-22 squadrons
  - 4 Reserve MV-22 squadrons

**Note:** All squadrons will be 12 plane squadrons except for the Fleet Reserve Squadron (40 planes and HMX-1 19 Planes).